

$$\int_{\mathbb{T}^r} \frac{du_j}{2\pi i u_j} \prod_{i < j} \overline{u_i - u_j}^a u^\gamma$$

$$\bigwedge_{0 \leq t < 2\pi} it \mathbf{e}^\alpha = it\alpha \mathbf{e} \Rightarrow \int_{\overset{0}{\mathbb{C}}_1} z^\alpha \overline{1-z}^\beta z^\gamma = \underbrace{2\pi i \alpha \mathbf{e} - 1}_{\text{}} \int_{\overset{0}{|}1} x^\alpha \overline{1-x}^\beta x^\gamma$$